KSLCA Corner (Korean Society for LCA)

Advances of LCA Activities in Korea

Tak Hur

Materials Chemistry & Engineering, Konkuk University, 1 Hwayang-dong Gwangjin-gu, Seoul, Korea (takhur@konkuk.ac.kr)

We would like to provide an update of the LCA activities and status in Korea. In particular, this year will be very crucial for the dissemination and stabilization of LCA in Korea, since the 5-year national LCA project sponsored by the government will be completed. In the following, the advances of LCA activities made in Korea are briefly explained. There are four main areas of LCA-related activities: methodology development, LCI database construction, policy, and case studies.

1 Methodology development. A full LCA study can be very detailed, expensive and time-consuming..The development of faster and more selective LCA methodologies is desirable for many short-living products and products of small and medium-sized enterprises (S&MEs). An attempt to make LCA more user friendly has yielded the development of simplified LCA methodologies and related software tools.

The importance of LCA and its role in Eco-design is also recognized by both the government and industry. Several Eco-design projects which are supported by the government are carried out to develop both general and product-specific guidelines, to identify the linkage with LCA, and to develop easy-to-use software. The simplified LCA methodology is utilized in integrating environmental aspects into product design and development processes.

While research related to LCI has centered on technical issues such as allocation, data quality and data format, research on methodology development for LCIA includes fundamental research of weighting methodology and the generation of weighting factors that reflect the characteristics of the Korean situation. Distance-to-target approach was used to calculate the reduction factor for each impact category, and for the weighting factors Delphi-like panel method and AHP method were combined to generate them. For the characterization step in LCIA, so far, most of the studies have dealt with the characterization models and their indicators for emission or mid-point level and, thus, the normalization reference values for those indicators which reflect the Korean situation are prepared based on the emission or mid-point level characterization models. Now, few attempts have been made to deal with the characterization models and indicators based on the end-point level.

2 Database construction. The government has been making specific efforts to support the development of public databases. In 1998, the Ministry of Commerce, Industry & Energy (MOCIE), and the Ministry of Environment (MOE) undertook a 5-year national research project (1998–2003) for about 200 modules of representative raw materials, energy, processes, transport, and waste treatments. During the first four years of the two national LCA projects (MOE and MOCIE), LCI databases of about 180 representative modules which include raw materials, energy, process, transportation, and waste treatment have been constructed. This is the final year of the national LCA project and the LCI databases of about 20 modules will be added.

This year will be very crucial for the dissemination and stabilization of LCA in Korea, since the 5-year LCA project for the construction of national LCI databases will be completed by the end of September 2003, providing methodologies, data format, software and the databases of about 200 modules. How to manage the existing LCI modules, update them regularly and keep adding new LCI modules will become very important for the next stage. MOE and MOCIE are trying to solve these issues.

3 Policy. At present, the main role of LCA in policy areas is in environmental labeling. In 2000, the MOE incorporated Type III Environmental Declaration Program into the law 'Development of environmental techniques and related systems', since there was an increasing demand for the continuous improvement of the environmental aspects

of products. Since then, the administration body, certification body, and training body were designated, and the first eight target product groups selected for the certification include automobile oil filter, gasoline, glass, monitor, paper towel, PDP TV, refrigerator, and tire. Now, the product-specific guideline for each product group has been developed and 50 qualified auditors who completed the training course and passed the qualification examination are authorized. The first certification of the Korean Type III program was awarded in May 2002 and so far eight product groups are certified. Now, the product groups Air-conditioner, CD-Rom, detergents, EP rubber and washing machine are in the process of certification.

There are high expectations of LCA's future use in policy areas such as green government purchasing, green supply chain management and strategic planning of waste management. The MOE is trying to establish a law intended to promote environmentally friendly products through green procurement. The guides of green purchasing and green supply chain management are to be developed. As to waste management, the Korea Ministry of Science and Technology established the Industrial Waste Recycling R & D Center (IWRRC) in 2000 under national programs to conduct research on industrial waste recycling and to set up related policies for the next 10 years. LCA studies on industrial waste recycling have been included and are under execution in order to establish LCI databases of recycling methods. LCA is used to analyze the environmental consequence of different waste management options such as recycling rates, collection schemes, and waste-treatment technologies.

4 Case studies. Recently, in Korea LCA has found its application in assessing the environmental characteristics of new technologies or processes and confirming the potential improvements of their environmental aspects. Therefore, many LCA studies are being carried out centered around the Korean Society for LCA (KSLCA) for new product systems or processes such as fuel cell vehicle, detergent free washing system, lead free soldering process, and so on.

So far, many case studies have been carried out for home electronics and automobiles. Most of these studies are for assembling products rather than material production or material products. This is most likely due to the fact that most of the assembling products are export items, and the demand for environmental data is relatively higher than in the domestic market. However, research on material products such as steel, petroleum chemical products, etc. and disposable products such as detergents, packaging materials, etc. clearly show the recent trend of expanding the scope of LCA studies in Korea.

S&MEs are beginning to perform LCA even though they are not as active as the conglomerates. Because of the strong requests from big companies for greening their supply chains, some S&MEs which mainly produce parts, components or modules for the final products start to carry out LCA studies. They are also training experts by participating in LCA-related education programs and workshops sponsored by KSLCA. In addition, the importance of developing LCA guidelines which are more specific for S&MEs are recognized, since in Korea the majority of companies falls in this group. Therefore, government, KSLCA, and other relevant institutions are under pressure to develop LCA guidelines, education programs, and easy-to-use software for S&MEs.